

caBIG® Overview

WHAT IS caBIG®?

The cancer Biomedical Informatics Grid® (caBIG®) initiative, overseen by the National Cancer Institute Center for Biomedical Informatics and Information Technology (NCI-CBIT), was conceived to address the needs of all constituencies in the cancer community — researchers, clinicians, and patients — to share data and knowledge, simplify collaboration, speed research, reduce the burden of cancer and ultimately realize the potential of Personalized Medicine. caBIG® also addresses a critical problem facing both basic and clinical researchers today — an explosion of data that requires new approaches for collection, management, and analysis. Although initially developed within the context of cancer research and care, caBIG® technology is widely applicable to other therapeutic areas.

"What is required in cancer research to find definitive answers is a system to share data and leverage all the events in the cancer world. It is impossible to succeed without embracing that notion. The concept of caBIG® is, therefore, right on target."

– **Kim Lyerly, M.D.**, Director
Duke Comprehensive Cancer Center, Duke University

WHY RESEARCHERS USE caBIG®

caBIG® tools and infrastructure allow researchers and clinicians to collaborate with colleagues in their own institutions or across the globe simply and securely, leveraging shared expertise and large multidisciplinary data collections so that complex biological questions may be asked and answered faster and more effectively than ever before.

"I think that we're entering an era where the greatest impact that we can have in terms of improving care for cancer patients is going to be through collaboration. And if we are really going to be able to collaborate, we have to be able to communicate effectively. We have to be able to share data. We have to be able to share biospecimens. It's about the impact, not about the ownership."

– **Mary Beckerle, Ph.D.**, Executive Director
Huntsman Cancer Institute, University of Utah

WHO IS USING caBIG®?

In the first year of widespread deployment throughout the research and clinical communities, 43 NCI-designated Cancer Centers and 16 member hospitals of the National Community Cancer Centers Program (NCCCP) were actively implementing caBIG® tools and infrastructure to address their need for data sharing and collaboration; those numbers are continually increasing.

"I quickly recognized how important it is for Lombardi, and for all cancer centers, to have access to the kinds of tools that caBIG® provides. The tissue repositories, the genomics repositories, and the evolving clinical database are all elements of potential high value for cancer centers as they attempt to develop systems biology and systems medicine tools."

– **Louis Weiner, M.D.**, Director
Lombardi Comprehensive Cancer Center, Georgetown University

caBIG® has also been embraced outside of the cancer community, as the need for connectivity and data sharing to speed basic and clinical research grows. More than 1500 individuals from more than 450 organizations are connecting with caBIG®, either by adopting existing caBIG® tools and services or by adapting existing technologies to become caBIG® compatible.

caBIG® IN ACTION: THE CANCER GENOME ATLAS (TCGA)

caBIG® is the technical foundation upon which many cancer research initiatives are built, including The Cancer Genome Atlas (TCGA), an integrated database that houses molecular and clinical data generated by multiple research centers. caBIG® provides the infrastructure, data standards, and tools required to collect, organize, share, and analyze this information. These capabilities enable researchers from varied disciplines and locations to access and easily perform complex queries on this rich data—resulting in unprecedented opportunities to discover and develop a new generation of targeted diagnostics, therapies, and preventive strategies for cancer.

To learn more about TCGA, visit <http://cancergenome.nih.gov/dataportal/data/about>

caBIG® TOOLS

caBIG® is founded on four key principles: **Open Access**, **Open Development**, **Open Source**, and **Federation**. These principles have guided the development of interoperable software tools, data standards, and a computing infrastructure conceived to advance basic and clinical research. To make it easy for users to get started, three “bundles” have been created: The Clinical Trials Compatibility Framework and the Life Sciences Distribution, which provide grid-enabled tools and services, and the Data Sharing and Security Framework, which provides guidelines and model documents to address data sharing and security issues.

A full list of tools available for adoption or adaptation is available online:

https://cabig.nci.nih.gov/tools/toolsearch_view

KEY caBIG® TOOLS

Clinical Trials and Imaging	Life Sciences and Translational Research
<ul style="list-style-type: none">• Cancer Adverse Event Reporting System (caAERS)• Cancer Central Clinical Participant Registry (C3PR)• Cancer Data Exchange (caXchange)• Patient Study Calendar (PSC)• Clinical Trials Data Management System (CDMS) Integration• National Biomedical Imaging Archive (NBIA)• Annotation Imaging Markup (AIM)• eXtensible Imaging Platform (XIP)	<ul style="list-style-type: none">• caArray• caTissue Suite• geWorkbench• Cancer Genome-Wide Association Studies (caGWAS)• cancer Bench to Bedside (caB2B)• caIntegrator2• caGrid

HOW DO I GET CONNECTED TO caBIG®?

NCI CBIIT welcomes new users—whether they adopt caBIG® technology or adapt existing tools to become caBIG®-compatible. Your organization can join the growing community of academic and commercial organizations that are implementing caBIG® and gaining the benefits of data sharing and collaboration with other researchers. A variety of programs, products, and services are being put in place to facilitate the adoption or adaptation of caBIG® technologies (https://cabig.nci.nih.gov/getting_connected).

General information may be found on the caBIG® Web site (<https://cabig.nci.nih.gov>), and support is available through the **Enterprise Support Network (ESN)**, a set of resources developed to expedite the integration of caBIG® technology. To learn more about the ESN, visit <https://cabig.nci.nih.gov/esn>. The ESN consists of two major components: caBIG® Knowledge Centers and caBIG® Support Service Providers.

caBIG® Knowledge Centers, a major component of the ESN, are providing specialized knowledge to support and expand the clinical and research communities around the specific domains in which they have expertise. Knowledge Centers provide comprehensive and up-to-date installation packages for caBIG® tools, as well as oversight of ongoing open source development of tools by the caBIG® community. Additional information on each of the six Knowledge Centers can be found online at https://cabig.nci.nih.gov/esn/knowledge_centers.

caBIG® Support Service Providers are third-party organizations that deliver software application and technical support to end-users and IT professionals. Specific services available include help desk support, adaptation and enhancement of caBIG®-compatible tools and software, on-site or off-site support for deploying caBIG® tools and infrastructure, and development of documentation and training materials. Certain vendors also provide face-to-face training on caBIG®. Service contracts are arranged between Support Service Providers and clients on a fee-for-services basis. Additional information can be found on Support Service Providers online at https://cabig.nci.nih.gov/esn/service_providers.

WHAT IS THE FUTURE OF caBIG®?

Ongoing development ensures that the caBIG® infrastructure continually improves and that new tools, data, and services are made available to meet the evolving needs of basic and clinical researchers. Global initiatives that utilize caBIG® to link cancer researchers across national boundaries are under way in the United Kingdom, India, China, Latin America, and the Middle East. And caBIG® is expanding outside of cancer research through the BIG Health initiative, a public-private partnership that is providing a model to integrate discovery research with clinical care seamlessly. As the integration of genomic data into electronic health records accelerates, caBIG® is poised to support the integration of clinical research with clinical care and expansion beyond cancer, ultimately resulting in improved treatments and outcomes for patients.

“caBIG® solves the major technical problems to allow data exchange within the cancer community, from molecules to patients’ clinical data. It is intended to revolutionize cancer research.”

– **Lynn Etheredge**, Rapid Learning Project,
George Washington University

HOW DO I FIND OUT MORE ABOUT caBIG®?

The **caBIG® Community Web site** provides tools and resources, including training modules, email newsletters, teleconferences, webcasts, and town hall meetings. You can sign up for informative newsletters that will keep you up to date on caBIG®.

For further information about caBIG®, visit <https://cabig.nci.nih.gov> (for information about caBIG® technologies, policies, projects, and organization) and caBIG® <http://cabig.cancer.gov> (for general information).

To subscribe to the caBIG® Announce Listserv for future updates on caBIG®, please visit:

https://list.nih.gov/cgi-bin/wa?SUBED1=cabig_announce&A=1.

To subscribe to the caBIG® e-newsletter featuring caBIG® community news, technology milestones, and case studies, please visit http://cabig.cancer.gov/email_signup.asp.





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